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			2633	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/782,098

Applicant(s)

MOELLER ET AL.

Examiner

Nathan Curs

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 7,8,10-14,32 and 38 is/are allowed.
- 6) ☒ Claim(s) 1-6,9, 15-27 and 33-37 is/are rejected.
- 7) ☒ Claim(s) 28-31 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2 and 6.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claim 25 is rejected under 35 U.S.C. 102(b) as being anticipated by Pua et al. (US Patent No. 6647176).

Regarding claim 25, Pua et al. disclose a method of determining a polarization mode dispersion in a transmission system, comprising: (a) propagating a data signal characterized by a wavelength range through an optical fiber in the transmission system (fig. 3, and col. 5, lines 8-14); and (b) determining the polarization mode dispersion (col. 1, lines 35-44, col. 2, lines 26-40) in the optical fiber concurrent with (a) by: (b1) directing a portion of the data signal into a polarization analyzer (fig. 1, element 108 and col. 3, lines 26-37), where the disclosed PMD compensation system is a polarization analyzer in that it measure the differential group delay and principal states of polarization of the signal ; (b2) measuring optical powers for the portion of the data signal as a function of wavelength within the wavelength range (col. 5, lines 4-14 and fig. 3, element 330 and col. 5, line 53 to col. 6, line 51); and (b3) generating polarization parameters from the optical powers measured in (b2) (col. 4, lines 43-65), where the

polarization parameters are the differential group delay and the primary states of polarization, which parameters dictate the PMD.

3. Claim 19 is rejected under 35 U.S.C. 102(e) as being anticipated by Erdogan et al. (US Patent No. 6211957).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Regarding claim 19, Erdogan et al. disclose an apparatus for polarization measurement, comprising: a polarization controller adapted to receive an optical signal and perform defined polarization transformations of the received optical signal, and a polarizer adapted to receive the optical signal exiting the polarization controller and define a polarization axis for the received optical signal (fig. 6, element 62, col. 4, lines 48-50 and col. 10, lines 52-56), where the quarter-wave plate is inherently a polarization controller and where an optical signal passing through a quarter-wave plate in position relative to an adjacent polarizer is inherently a polarization transformation, and where the polarization axis of an optical signal is inherently defined when passing through a polarizer; a wavelength dispersive element for separating the optical signal exiting the polarizer into a plurality of spectral components, and a photo-detector for detecting the plurality of spectral components (col. 11, lines 19-34).

4. Claims 25-27 rejected under 35 U.S.C. 102(e) as being anticipated by Moeller (US Published Patent Application No. 2002/0093643).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Regarding claim 25, Moeller discloses a system for determining polarization mode dispersion in a transmission system, comprising: propagating a data signal characterized by a wavelength range through an optical fiber in the transmission system and determining the polarization mode dispersion in the optical fiber (paragraphs 0006 to 0008) by: directing a portion of the data signal into a polarization analyzer (paragraph 0007 and fig. 1, element 140) and measuring optical powers for the portion of the data signal as a function of wavelength within the wavelength range (paragraphs 0008 and 0009); and generating polarization parameters from the optical powers measured (paragraph 0009).

Regarding claim 26, Moeller discloses directing the data signal through a polarization switch (paragraph 0007 and fig. 1, element 120).

Regarding claim 27, Moeller discloses measurements for two different and non-orthogonal polarization states of the data signal generated by the polarization switch (fig. 1 and paragraph 0009).

Claim Rejections - 35 USC § 103

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5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-6, 9, 15-21 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee (US Patent No. 5815270) in view of Hunsperger et al. (US Patent No. 4773063).

Regarding claim 1, Lee discloses a method of polarization measurement, comprising: (a) directing an optical signal characterized by a polarization state into a polarization controller (col. 1, lines 10-25), where an optical transmission signal inherently has a polarization state and where a quarter-wave plate is inherently a polarization controller; (b) directing the optical signal from the polarization controller into a polarizer (col. 1, lines 22-24); (c) setting the polarization controller to a plurality of positions, and (d) for each of the plurality of positions of the polarization controller, measuring the power of the optical signal using a photo-detector (col. 1, lines 28-31); and (e) obtaining the polarization state of the optical signal by analyzing the powers of the optical signal measured in (d), where it would have been obvious to one of ordinary skill in the art at the time of the invention that the four angular position measurements of Lee would be measured for determining Stokes parameters, corresponding to polarization-dependent fractions of light, and used to determine the polarization state, as similarly described for other prior art of different embodiment (col. 1, lines 51-58), and which four Stokes parameters are well known in the art for determining polarization state. Lee does not disclose directing the optical signal from the polarizer to a wavelength dispersive element to generate a dispersed optical signal comprising a plurality of spectral components each characterized by a wavelength range, or directing the dispersed optical signal into a photo-detector for detecting the plurality of spectral components. Hunsperger et al. disclose a WDM demultiplexer comprising a

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wavelength dispersive element demultiplexing a plurality of spectral components, and a photodetector for detecting the spectral components (col. 3, lines 19-33). Although Hunsperger et al. do not disclose details about the upstream source of WDM signal in context of the grating based demultiplexer, it would have been obvious to one of ordinary skill in the art at the time of the invention that a wavelength range characterizes each transmitted WDM channel, since Hunsperger et al. discloses that for a grating multiplexer the light source for each WDM channel is characterized by a wavelength range depending on the light source type (col. 8, line 56 to col. 9, line 4). Hunsperger et al. also teach that WDM enlarges the information transmission capacity of the system, thereby drastically reducing the cost per information channel in both materials of construction and installation (col. 2, lines 35-40). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the polarization measurement system of Lee by replacing the photodetector of Lee with the grating demultiplexer plus WDM photodetector of Hunsperger et al., in order to be able to take polarization measurements for the channels of a WDM system without requiring separate instances of single channel Lee polarization measurement systems for each WDM wavelength of a WDM system, thus the Lee polarization measurements system as modified by the teaching of Hunsperger et al. will also reflect the reduced cost per information channel in both materials of construction and installation similarly reflected by the WDM system itself.

Regarding claim 2, Lee in view of Hunsperger et al. disclose the method of claim 1, wherein the photo-detector is a photodiode array comprising a plurality of detectors (Hunsperger et al.: fig. 2, element 18 and col. 2, lines 35-40).

Regarding claim 3, Lee in view of Hunsperger et al. disclose the method of claim 2, wherein at least a subset of the plurality of detectors each detects only a portion of the dispersed optical signal (Hunsperger et al.: col. 3, lines 19-33). Lee in view of Hunsperger et al.

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do not disclose characteristics of the value of the Stokes vector within each of the detectors in a subset of detectors; however, Lee does disclose four angular positions of the quarter-wave plate in taking measurements (Lee: col. 1, lines 28-31), and Hunsperger et al. disclose that the each detector in the array detects a narrow portion of the dispersed optical signal corresponding to a channel's center wavelength (col. 6, lines 23-56). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that specific quarter-wave plate positions and focused wavelength photodetection would result in each of the four Stokes parameters measured for each wavelength remaining constant within each detector, in order to be able to calculate the state of polarization accurately for each WDM wavelength, avoiding detecting misleading Stokes parameters if the quarter-wave plate were not set to distinct positions for measurement (i.e. rotation change during a measurement) and/or if the photodetectors detected overlapping WDM wavelengths.

Regarding claim 4, Lee in view of Hunsperger et al. disclose the method of claim 3, wherein (e) comprises setting the polarization controller to at least four different positions (Lee: col. 1, lines 28-31).

Regarding claim 5, Lee in view of Hunsperger et al. disclose the method of claim 4, wherein (g) further comprises: (g1) generating an optical power parameter for each of the subset of the plurality of detectors (Hunsperger et al.: col. 6, lines 23-56), where the detected power for each wavelength detector is thus an optical power parameter corresponding to the wavelength range of the wavelength detector; where it would have been obvious to one of ordinary skill in the art at the time of the invention that the four angular position measurements of Lee measured for calculating Stokes parameters would be used obtain the polarization state of the optical signal, as described above, and where it would have been obvious to one of ordinary skill in the art at the time of the invention that the Stokes parameters would be thus

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calculated for each wavelength range of each WDM detector when applied in the combination of Lee in view of Hunsperger et al., in order to determine the state of polarization for each wavelength of a WDM signal.

Regarding claim 6, Lee in view of Hunsperger et al. disclose the method of claim 5, further comprising: (h) calculating an optical power for the optical signal (Hunsperger et al.: Hunsperger et al.: fig. 2, element 18 and col. 6, lines 23-56).

Regarding claim 9, Lee in view of Hunsperger et al. disclose the method of claim 1, wherein the polarization controller is a quarter-wave plate rotated between plural positions (Lee: col. 1, lines 28-31), but do not disclose that the rotation is a function of time. However, since the single quarter-wave plate is used for four different measurements, it would have been obvious to one of ordinary skill in the art at the time of the invention to increment the quarter-wave plate to each of the four positions at a given rate, in order to provide the advantage of uniform measurements for each of the positions.

Regarding claim 15, Lee disclose a method of monitoring degree of polarization of an optical signal, comprising: (a) directing the optical signal into a polarization controller (col. 1, lines 10-25), where a quarter-wave plate is inherently a polarization controller; (b) directing the optical signal from the polarization controller into a polarizer (col. 1, lines 22-24); (d) directing the optical signal from the polarizer to a photo-diode (col. 1, lines 26-28); (e) setting the polarization controller to a plurality of positions and (f) for each of the plurality of positions of the polarization controller, measuring an optical power detected by the detector (col. 1, lines 28-31); and (g) obtaining the degree of polarization of the optical signal by analyzing the optical powers measured in (f), where it would have been obvious to one of ordinary skill in the art at the time of the invention that the four angular position measurements of Lee would be measured for determining Stokes parameters, corresponding to polarization-dependent fractions of light, and

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used to determine the polarization state, as similarly described for other prior art of different embodiment (col. 1, lines 51-58), and which four Stokes parameters are well known in the art for determining polarization state. Lee does not disclose directing the optical signal from the polarizer to a wavelength dispersive element to generate a dispersed optical signal comprising a plurality of spectral components, or directing the dispersed optical signal into a photo-diode array comprising a plurality of detectors for detecting the plurality of spectral components. Hunsperger et al. disclose a WDM demultiplexer comprising a wavelength dispersive element demultiplexing a plurality of spectral components, and a photodetector for detecting the spectral components (col. 3, lines 19-33). Hunsperger et al. also teach that WDM enlarges the information transmission capacity of the system, thereby drastically reducing the cost per information channel in both materials of construction and installation (col. 2, lines 35-40). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the polarization measurement system of Lee by replacing the photodetector of Lee with the grating demultiplexer plus WDM photodetector of Hunsperger et al., in order to be able to take polarization measurements for the channels of a WDM system without requiring separate instances of single channel Lee polarization measurement systems for each WDM wavelength of a WDM system, thus the Lee polarization measurements system as modified by the teaching of Hunsperger et al. will also reflect the reduced cost per information channel in both materials of construction and installation similarly reflected by the WDM system itself.

Regarding claim 16, Lee in view of Hunsperger et al. disclose the method of claim 15, wherein the optical signal is a data signal in a wavelength division multiplexed (WDM) system characterized by a plurality of WDM channels (Hunsperger et al.: col. 2, lines 10-51), where an information signal is a data signal.

Regarding claim 17, Lee in view of Hunsperger et al. disclose the method of claim 16, wherein each of the plurality of WDM channels is detected by a different subset of the plurality of detectors (Hunsperger et al.: col. 6, 23-56), where a subset comprises one detector as disclosed by Hunsperger et al.

Regarding claim 18, Lee in view of Hunsperger et al. disclose the method of claim 17, wherein (g) further comprises calculating Stokes components corresponding to each of the plurality of WDM channels to obtain the degree of polarization for each of the plurality of WDM channels, as described above.

Regarding claim 19, Lee discloses an apparatus for polarization measurement, comprising: a polarization controller adapted to receive an optical signal and perform defined polarization transformations of the received optical signal (col. 1, lines 22-30), where an optical signal passing through a quarter-wave plate in a rotated position relative to an adjacent polarizer is inherently a polarization transformation; a polarizer adapted to receive the optical signal exiting the polarization controller and define a polarization axis for the received optical signal (col. 1, lines 22-30), where the polarization axis of an optical signal is inherently defined when passing through a polarizer; and measuring the power of the optical signal output from the polarizer using a photo-detector (col. 1, lines 28-31). Lee does not disclose a wavelength dispersive element for separating the optical signal exiting the polarizer into a plurality of spectral components and detecting the plurality of spectral components. Hunsperger et al. disclose a WDM demultiplexer comprising a wavelength dispersive element demultiplexing a plurality of spectral components, and a photodetector for detecting the spectral components (col. 3, lines 19-33). Hunsperger et al. also teach that WDM enlarges the information transmission capacity of the system, thereby drastically reducing the cost per information channel in both materials of construction and installation (col. 2, lines 35-40). It would have

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been obvious to one of ordinary skill in the art at the time of the invention to modify the polarization measurement system of Lee by replacing the photodetector of Lee with the grating demultiplexer plus WDM photodetector of Hunsperger et al., in order to be able to take polarization measurements for the channels of a WDM system without requiring separate instances of single channel Lee polarization measurement systems for each WDM wavelength of a WDM system, thus the Lee polarization measurements system as modified by the teaching of Hunsperger et al. will also reflect the reduced cost per information channel in both materials of construction and installation similarly reflected by the WDM system itself.

Regarding claim 20, Lee in view of Hunsperger et al. disclose the apparatus of claim 19, wherein the wavelength dispersive element is a grating (Hunsperger et al.: col. 2, lines 10-34).

Regarding claim 21, Lee in view of Hunsperger et al. disclose the apparatus of claim 19, wherein the photo-detector is a photodiode array (Hunsperger et al.: col. 3, lines 19-33).

Regarding claim 24, Lee in view of Hunsperger et al. disclose the apparatus of claim 19, wherein the wavelength dispersive element has an optical resolution at least sufficient to resolve adjacent signal channels in a wavelength division multiplexed communication system (Hunsperger et al.: col. 2, lines 10-51 and col. 6, lines 23-56).

7. Claims 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee (US Patent No. 5815270) in view of Hunsperger et al. (US Patent No. 4773063) as applied to claims 1-6, 9, 15-21 and 24 above, and further in view of Damask (US Patent No. 6377719).

Regarding claims 22 and 23, Lee in view of Hunsperger et al. disclose the apparatus of claim 19, but do not disclose that the polarization controller is a lithium niobate electro-optic device. Damask discloses an electro-optic lithium niobate polarization controller used for transforming the state of polarization of a signal by imparting a rotation on the waveguide (col.

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4, lines 27-32). It would have been obvious to one of ordinary skill in the art at the time of the invention to use an electro-optic lithium niobate polarization controller, disclosed by Damask, in the system of Lee in view of Hunsperger et al., because of the small size that can be achieved, relative to a mechanically rotated quarter-wave plate, when fabricating a lithium niobate device.

8. Claims 33-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gordon et al. (US Patent No. 6519027) in view of Lee (US Patent No. 5815270), and further in view of Hunsperger et al. (US Patent No. 4773063).

Regarding claim 33, Gordon et al. disclose an apparatus for determination of polarization mode dispersion in an optical fiber, comprising: a polarization switch connected to an input of the optical fiber characterized by a polarization mode dispersion (fig. 2, element 40 and col. 5, lines 11-25), where an optical fiber is inherently characterized by polarization mode dispersion; and a polarization analyzer connected to an output of the optical fiber (fig. 2, element 52, col. 1, lines 47-67 and col. 5, lines 32-42), where the polarimeter is a polarization analyzer that takes PMD measurements. Gordon et al. also disclose taking PMD measurements at a plurality of transmitted wavelengths (col. 1, lines 7-14). Gordon et al. do disclose that the polarization analyzer measures PMD by a prior technique, but not disclose that the polarization analyzer comprises a polarization controller, a polarizer, a wavelength dispersive element and a photo-detector. Lee discloses a conventional method of polarization measurement, comprising: directing an optical signal characterized by a polarization state into a polarization controller (Lee: col. 1, lines 10-25), where an optical transmission signal inherently has a polarization state and where a quarter-wave plate is inherently a polarization controller; directing the optical signal from the polarization controller into a polarizer (Lee: col. 1, lines 22-24); setting the polarization controller to a plurality of positions, and for each of the plurality of positions of the polarization

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controller, measuring the power of the optical signal using a photo-detector (Lee: col. 1, lines 28-31); and obtaining the polarization state of the optical signal by analyzing the powers measured, where it would have been obvious to one of ordinary skill in the art at the time of the invention that the four angular position measurements of Lee would be measured for determining Stokes parameters, corresponding to polarization-dependent fractions of light, and used to determine the polarization state, as similarly described for other prior art of different embodiment (Lee: col. 1, lines 51-58), and which four Stokes parameters are well known in the art for determining polarization state. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the conventional polarization analyzer disclosed by Lee as the polarization analyzer disclosed by Gordon et al., in order to measure PMD of the received signal in the system of Gordon et al. using a prior technique, as disclosed by Gordon et al. Also, Gordon et al. in view of Lee disclose taking PMD measurements at a plurality of transmitted wavelengths (Gordon et al.: col. 1, lines 7-14), but do not disclose that the polarization analyzer comprises a wavelength dispersive element. Hunsperger et al. disclose a WDM demultiplexer comprising a wavelength dispersive element demultiplexing a plurality of spectral components, and a photodetector for detecting the spectral components (col. 3, lines 19-33). Hunsperger et al. also teach that WDM enlarges the information transmission capacity of the system, thereby drastically reducing the cost per information channel in both materials of construction and installation (col. 2, lines 35-40). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the polarization analyzer of Gordon et al. in view of Lee by replacing the photodetector of the Lee-type polarization analyzer with the grating demultiplexer plus WDM photodetector of Hunsperger et al., in order to be able to take polarization measurements for the plurality of wavelengths disclosed by Gordon et al. without

requiring separate instances of single wavelength polarization analyzers for measurements of wavelength of the system of Gordon et al.

Regarding claim 34, Gordon et al. in view of Lee in view of Hunsperger et al. disclose the apparatus of claim 33, wherein the wavelength dispersive element is a diffraction grating (Hunsperger et al.: col. 2, lines 10-34).

Regarding claim 35, Gordon et al. in view of Lee in view of Hunsperger et al. disclose the apparatus of claim 34, wherein the photo-detector is a photodiode array (Hunsperger et al.: fig. 2, element 18 and col. 2, lines 35-40).

9. Claims 36 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gordon et al. (US Patent No. 6519027) in view of Lee (US Patent No. 5815270), and further in view of Hunsperger et al. (US Patent No. 4773063) as applied to claims 33-35 above, and further in view of Damask (US Patent No. 6377719).

Regarding claims 36 and 37, Gordon et al. in view of Lee in view of Hunsperger et al. disclose the apparatus of claim 35, but do not disclose that the polarization controller is a lithium niobate electro-optic device. Damask discloses an electro-optic lithium niobate polarization controller used for transforming the state of polarization of a signal by imparting a rotation on the waveguide (col. 4, lines 27-32). It would have been obvious to one of ordinary skill in the art at the time of the invention to use an electro-optic lithium niobate polarization controller, disclosed by Damask, in the system of Gordon et al. in view of Lee in view of Hunsperger et al., because of the small size that can be achieved, relative to a mechanically rotated quarter-wave plate, when fabricating a lithium niobate device.

Allowable Subject Matter

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10. Claims 7, 8, 10, 11-14, 32 and 38 are allowed.

The following could not be found in the prior art:

Regarding claim 7, prior art could not be found where each of the dispersed spectral components of the wavelength dispersive polarization measurements means include more than one WDM channel.

Regarding claim 8, prior art could not be found where a polarization controller uses the claimed four combinations of angle relationships between a quarter-wave plate and a half-wave plate.

Regarding claim 10-14, prior art could not be found where one or more of the plurality of spectral components of the wavelength dispersive polarization measurement means has a corresponding Stokes vector that varies within the respective wavelength range;

Regarding claim 32, the prior art search did not disclose a PMD compensator which receives a WDM signal and derives PMD information to control the PMD compensator, where the a first portion of the WDM signal goes to a polarization analyzer comprising a polarization controller, a polarizer, a wavelength dispersive element and a photo-detector array for determining Stokes parameters to obtain the degree of polarization for each of the plurality of WDM channels; and where a second portion of the WDM signal is directed from the PMD compensator to a receiver.

Regarding claim 38, the prior art search did not disclose a wavelength division multiplexed (WDM) communication system, comprising: a polarization switch connected to an output of a WDM multiplexer; a polarization analyzer for receiving a first portion of the multiplexed optical signal transmitted through the transmission fiber, where the polarization analyzer comprises a polarization controller, a polarizer, a wavelength dispersive element and a photo-detector array; and a PMD compensator responsive to a control signal based on the

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result from the polarization analyzer, for converting a second portion of the multiplexed optical signal transmitted through the transmission fiber into a PMD-compensated multiplexed optical signal.

11. Claims 28-31 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

12. Applicant's arguments filed 5 February 2004 have been fully considered but with regard to claims 19 and 25-27 they are not persuasive.

Regarding claim 19, the applicant argues that argues that the Erdogan et al. reference does not disclose "a polarization controller adapted to receive an optical signal and perform defined polarization transformations of the received optical signal". However, Erdogan et al. does disclose the claimed subject matter. Specifically, the quarter-wave plate of Erdogan et al. is inherently a polarization controller and an optical signal passing through a quarter-wave plate in position relative to an adjacent polarizer is inherently a polarization transformation. Since Erdogan et al. also disclose the possibility of polarization characterization for multi-wavelength signals, thus the disclosure of Erdogan et al. can also perform defined polarization transformations, corresponding to the multiple wavelengths, as opposed to only one polarization transformation of a single wavelength signal.

Regarding claims 25-27, the applicant argues that the Moeller reference does not disclose "measuring optical powers for the portion of the data signal as a function of wavelength with the wavelength range" and "generating polarization parameters from the optical powers

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measured". However, Moeller does disclose the claimed subject matter. Specifically, the optical signal of Moeller inherently has a wavelength range, and the polarimeter of Moeller is used to obtain polarization parameters based on measurements of a selected frequency range of the data signal that enters the polarimeter after being band-pass filtered. Since frequency is simply the speed of light divided by wavelength, the terms "frequency" and "wavelength" are essentially interchangeable. Thus the claimed "portion of the data signal" in Moeller is the selected band-pass filtered frequency range within the inherent range of the optical signal, and the claimed generation of "polarization parameters from the optical powers measured" in Moeller are the parameters obtained from the optical measurements using the polarimeter.

13. Applicant's arguments, see Section D, filed 5 February 2003, with respect to the rejections of claims 7, 10-14, and 28-32, and 38 have been fully considered and are persuasive with regard to the traversal of the 103 rejection based on common assignment of the references with the assignee of the application. The rejections of claims 7, 10-14 and 28-32 and 38 have been withdrawn.

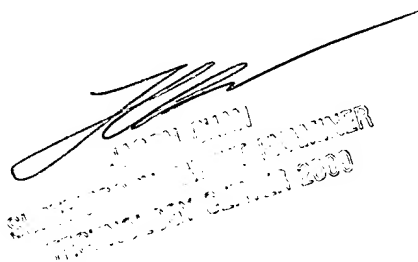
14. Applicant's arguments, see Section D (pages 19-30), filed 5 February 2004, with respect to the rejections of claim(s) 1-6, 9, 15-24 and 33-37 under 35 USC 103 have been fully considered and are persuasive with regard to the traversal of the 103 rejection based on common assignment of the references with the assignee of the application. Therefore, the rejections have been withdrawn. However, upon further consideration, a new grounds of rejection are made as described above.

Conclusion

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15. Any inquiry concerning this communication from the examiner should be directed to N. Curs whose telephone number is (703) 305-0370. The examiner can normally be reached M-F (from 9 AM to 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan, can be reached at (703) 305-4729. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.



A handwritten signature in black ink is written over a rectangular official stamp. The stamp contains the following text: "APPROVED FOR SIGNATURE", "JASON CHAN", "SUPERVISOR", and "DATE: 01/11/2011".